Space Weather Forecast

Issued on Monday, 29 August 2022 at 13:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares (R1-R2) likely at first. Chance of Minor Geomagnetic Storm day 1. Chance of further Minor Radiation storms (S1).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Moderate. Further M-class flares were observed from AR3088 which has now rotated around the southwest limb. Two R2 Flares were observed, the largest but short-lived M8.6 was observed at 29/1107 UTC and a long period M6.7 at 28/1619 UTC, the latter of which gave a coronal mass ejection that has been analysed as missing ahead of Earth. AR3089 in the southeast, is currently the largest and most complex region on the disk, with a delta spot configuration. AR3085, AR3086 and AR3087 are all simple with little overall change observed. No other Earth-directed CMEs were observed occurring in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind was at slightly elevated levels initially due to the high speed stream related to coronal hole 18. The waning effects of coronal hole 18 let solar wind speeds drop to background levels, before rising again by 29/0300 UTC, to slightly elevated levels due to the likely glancing blow of a coronal mass ejection which left the sun on the 27th. This was then followed by the probable arrival of the high speed stream from coronal hole 17 late in the AM of 29th UTC allowing solar winds speeds to become Elevated. The total interplanetary magnetic field was at weak to moderate levels, with no sustained negative periods observed in the north-south component, which fluctuated between moderately positive and negative. Geomagnetic activity was therefore Quiet to Active (Kp1-4).

Energetic Particles / Solar Radiation: No solar radiation storms have been observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are likely with a slight chance of an isolated Strong-class flare. This risk will probably decrease through the period as the main sunspot in the southwest AR3088 continues to rotate off the disc, however the sunspot in the southeast AR3089 will need to be monitored for any further development.

Solar Wind / Geomagnetic Activity: Ongoing coronal hole high speed stream enhancements are possible from CH17/- during the next two days (29th and 30th), with the slightly elevated or elevated solar winds only gradually easing from day 3 (31st) onward. Geomagnetic Activity is expected to be Unsettled to Active at first, gradually becoming Quiet. There remains a chance of G1/Minor Storms due to the ongoing connection to CH17/-. Mainly Quiet geomagnetic conditions expected from day 3 (31st).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently below the S1 Minor Radiation Storm level. There remains a chance of further increases to or above the S1 level, due to any notable flares from the large sunspot located in the far southwest of the visible disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	20	1	1
Strong	G3	No	15	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	30	30	30
Very Active	R3 to R5 X	No	20	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	30	20	10	5
Very Active	≥ S3 *	No	5	5	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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